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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

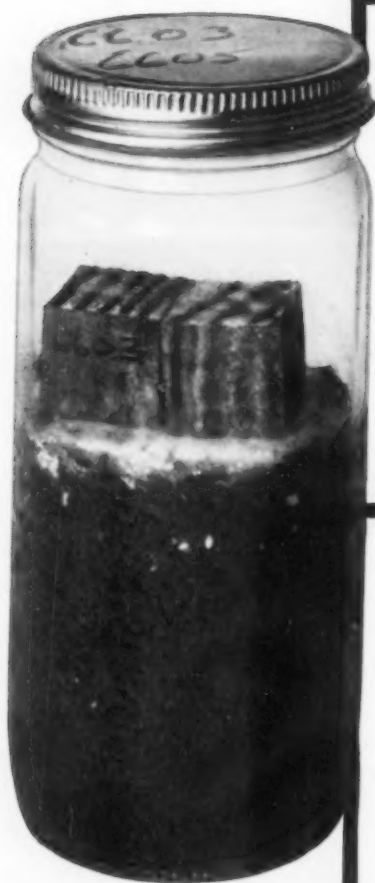
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DETROIT



Flying Runway

See Page 152

A SCIENCE SERVICE PUBLICATION



THIS BOTTLE TURNS SEVEN YEARS INTO SEVEN MONTHS

Test blocks of pole wood are fed to destructive fungi in bottles like this at Bell Laboratories. Wood rests on soil which controls moisture conditions and promotes fungus growth. Test speeds search for better preservatives.

This year the Bell System is putting 800,000 new telephone poles into service. How effectively are they preserved against fungus attack and decay?

Once the only way to check a preservative was to plant treated wood specimens outdoors, then wait and see—for seven years at least. Now, with a new test devised in Bell Laboratories most of the answer can be obtained in seven months.

Cubes of wood are treated with preservatives, then enclosed in bottles with fungus of the most destructive kind, under temperature and humidity conditions that accelerate fungus activity. Success—or failure—of fungus attack on cubes soon reveals the best ways to preserve poles.

The test has helped show how poles can be economically preserved for many years. It is another example of how Bell Telephone Laboratories works to keep down your telephone costs.

A boring is taken from a pole section to see how far preservative has penetrated. For poles to last, it must penetrate deeply and be retained for a long time.



BELL TELEPHONE LABORATORIES

Improving telephone service for America provides careers for creative men in scientific and technical fields.

ASTRONOMY

Magellanic Clouds Farther

Radio waves show that both the Large and Small Clouds of Magellan take in more space and are in more turbulent motion than when measured by light.

► RADIO MESSAGES that tell of the internal and external activities of our nearest galactic neighbors, a hundred million billion miles away, were reported to the American Astronomical Society meeting in Boulder, Colo.

The volumes of the Clouds of Magellan are larger and their motions more turbulent when measured by radio waves than by ordinary light, Drs. Frank J. Kerr and J. V. Hindman of the Radiophysics Laboratory, Sydney, Australia, informed the astronomers in a paper read at the meeting by Bernard Y. Mills, also of the Laboratory.

The astronomers also learned that the Magellanic Clouds are farther away than previously thought. Dr. Harlow Shapley of Harvard College Observatory communicated the new value of 175,000 light years for their distance, an increase of 25,000 light years from that reported to the astronomers in December, 1952. (See SNL, Jan. 10, p. 19.) A light year is the distance traveled by light at 186,000 miles per second in a year, or nearly six million million miles.

Dr. Shapley's new distance figure is based on measurements of stars in globular clusters that are inside the Magellanic Clouds, visible only from the Southern Hemisphere.

The Australian scientists made their new radio wave studies of the distribution, abundance and motion of hydrogen gas in both the Large and Small Magellanic Clouds with techniques developed this past year at the Harvard, Leiden and Sydney Observatories. The new techniques are for the discovery and measurement of the peculiar radiations emitted by the neutral hydrogen atoms that are in the spaces between the stars. The wavelength of this radiation is about eight inches, but the exact wavelength depends on the motions of the clouds of hydrogen gas and is a measure of that motion.

If the gas is approaching, the wavelength is shorter; if it is receding, the wavelength is longer. Drs. Kerr and Hindman found various wavelength shifts in different parts of the Clouds. They conclude, therefore, that at least the Large Cloud is turbulent inside, as its irregular structure would suggest.

They also found that the Clouds are rotating around a common center of gravity, with the Large Cloud at this time receding, the Small Cloud approaching, at the relative rate of about 30 miles a second. The Clouds are traveling through space together, as they revolve around each other, at a speed of more than 300 miles a second.

In all this new and important work on the anatomy of the nearby galaxies, as re-

vealed by the measures of neutral hydrogen gas, it is assumed that as the hydrogen gas goes, so goes the whole galaxy of hundreds of millions of stars.

Drs. Kerr and Hindman discovered that the hydrogen gas of the Clouds is spread out in space more widely than are the stars. The volumes of the Magellanic Clouds as indicated by the radio signals are probably twice the dimensions that are shown by optical means, that is, by the blue light signals, or photographs, of the component stars.

The optical work has been done by Harvard College Observatory astronomers, who have been the chief investigators of the Clouds for the last 50 years.

The Australian scientists estimate the interstellar hydrogen constitutes about 10% of the total material of the Small Cloud, and three percent of the Large Cloud.

Their work is still in its preliminary stages, but their researches are considered by astronomers to be among the most important contributions in recent years to our knowledge of the structure of the galaxies that lie outside our own.

The method of employing the radio technique to show the neutral hydrogen of interstellar space has been used by Dutch astronomers during the past year to map out the spiral structure of our own galaxy.

Science News Letter, September 5, 1953

MEDICINE

High Blood Pressure in Elderly Can Be Helped

► HIGH BLOOD pressure can be brought down in elderly people, even when their arteries have hardened and grown inelastic, Drs. R. Harris and J. J. Phelan of the Ann Lee Home, Albany, N. Y., declared at the meeting of the Gerontological Society in San Francisco.

For periods up to one year they treated 26 patients at the Home with varying doses of 1-hydrazinophthalazine (Aapresoline). No serious side effects showed up. Of the 26, 18 showed definite drops in both systolic and diastolic blood pressures. Several also showed improvement in the patterns of their electrocardiographs, indicating lessened heart disturbance. Although the blood pressure was not improved in eight patients, most of these eight felt better while taking the drug.

In one group of the patients, the high blood pressure improved and after several months of the drug the improvement was held even when the drug was stopped or when an inactive medicine was substituted.

Another group improved while taking the Aapresoline but the blood pressure rose when it was stopped.

Science News Letter, September 5, 1953



KIN TO ELEPHANT—The new byrax at the National Zoological Park in Washington is believed to be a relative of the elephant. Both may have had a common ancestor, examination of fossils shows.

GENERAL SCIENCE

Bureau Director Retained

At the Secretary of Commerce's request and in line with a recommendation of the evaluating committee, Dr. Allen V. Astin remains as head of the National Bureau of Standards.

► DR. ALLEN V. ASTIN has been asked by Secretary of Commerce Sinclair Weeks to continue as director of the National Bureau of Standards upon recommendation of the evaluation committee headed by Dr. M. J. Kelly, president of the Bell Telephone Laboratories, concurred in by the regular visiting committee.

Resolving in part the controversy that arose over Dr. Astin's dismissal on March 30 as a part of the new administration's rearrangements, the retention of the Bureau's director follows three major actions that affect this scientific organization's work:

1. Cuts were made by Congress in the basic appropriations for non-defense work, amounting to 25% of previous funds, or \$1,613,000. Research and testing funds were cut from \$4,000,000 to \$3,000,000, radio propagation research from \$2,613,000 to \$2,000,000, and administration and operation funds maintained at \$1,000,000. Between 400 and 500 employees as a consequence will be "rif" victims (reduction in force).

2. Ordnance research for the Department of Defense concerned with such developments as proximity fuses, new weapons, etc. are being transferred out of Standards to direct Defense Department operation, although the same staff and laboratories will be used. This cuts \$30,000,000 in transferred funds out of the Standards expenditures. Close to 2,000 Standards employees, mostly scientists, will be shifted.

3. "Non-technical policy and procedural matters on commercial product evaluation" at Standards is being made the responsibility of the Secretary of Commerce and Dr. Astin's responsibility limited to the technical area. Standards is also being transferred to the supervision of Assistant Secretary of Commerce for Administration James C. Worthy instead of Assistant Secretary Craig R. Sheaffer who was responsible in the first instance for the dismissal of Dr. Astin. Thus the time-honored work of Standards in protecting the government, industry and the public from substandard materials, over-enthusiastic claims, or downright frauds is shifted largely to the politically-dominated department.

The battery additives controversy touched off the Standards trouble, arousing the apprehension and protests of many scientific and technical societies. The latest act in this situation is the canceling by the Post Office of the fraud order against battery additive AD-X2. Suspended since March 2, the order was nevertheless under fire by the incompleting hearings of the Senate Small

Business Committee. The canceling of the order came only a day before Secretary Weeks told Dr. Astin to stay on the job.

There is some apprehension that the handling of the AD-X2 case might open the way to giving immunity from investigation and appraisal to other commercial products about which questions have been raised.

The Bureau of Standards will have about 2,500 employees July 1, 1954, compared with about 5,000 on the same date this year, as a result of the cuts in appropriations and transfers of functions.

Science News Letter, September 5, 1953

PHARMACOLOGY

New Drug Discovery Rate Is Two a Year

► NEW DRUGS are being discovered at the rate of about two a year, or one every six months, Harry J. Loynd, president of Parke, Davis and Company, Detroit, declared at the meeting of the American Pharmaceutical Association in Salt Lake City.

Only a few years back, he recalled, the drug industry and medical profession felt much was being accomplished if one new drug was discovered every 25 years.

Science News Letter, August 29, 1953

GENETICS

Small Pink Flower Shows Mechanism of Evolution

► A CALIFORNIA plant that produces small pink or lavender blooms in the spring has revealed the process of an important evolution mechanism by which living things can change from one species to another.

Dr. Harlan Lewis, University of California at Los Angeles geneticist, has found that the flowering plant, *Clarkia*, occasionally adds a chromosome, setting the stage for a species change, by an irregular division of chromosomes in the production of sex cells.

"For example, a *Clarkia* plant which normally has nine chromosomes may divide so that in one of the two cells there occurs ten chromosomes and in the other eight," says Dr. Lewis. "The eight chromosome cells die off but those with ten chromosomes may survive and give rise to functional sex cells."

"There may be no immediate outward change in the appearance of the plant. However, with the addition of the chromosome the plant has a greater capacity for mutations, so that in time it may become a

completely different plant from its nine-chromosome parent species. Thus a new species is born."

Such a change from one species to another has now been demonstrated to have occurred in *Clarkia* in Dr. Lewis' research.

The production of new species by the addition of a chromosome has been suggested in the past but this is the first demonstration that it actually occurs.

Science News Letter, September 5, 1953

Christopher Columbus discovered the pineapple on the Isle of Guadalupe in the West Indies.

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ASTRONOMY

Dwarf Stars' Growth

Spectroscope reveals, over period of months or years, how dwarf stars grow. Variations in the light from some is apparently caused by contact with interstellar dust clouds.

► THE GROWTH of dwarf stars by building up from dust particles in surrounding clouds can be watched by the spectroscopic "eyes" of giant telescopes.

The changes may, however, take months or years for astronomers to spot, Dr. Alfred H. Joy of the Mount Wilson and Palomar Observatories in California told the American Astronomical Society meeting in Boulder, Colo., in his address as retiring president.

Variations in the amount of light received from some dwarf stars in our Milky Way galaxy are apparently caused, Dr. Joy said, by contact of the stars with interstellar dust clouds. Because light from dwarf stars is very feeble, it is difficult to spot any except the nearest ones.

Another type of light variation, so far found only in nine stars, lasts for only a few minutes. In these stars, hot flares, covering only one or two percent of the surface, burst forth to increase the total brightness many times, but only for a very brief period. Hot flares of a similar type are frequently found near sunspots on the solar disk.

The spectrum, or rainbow of spread-out light, for such flares, Dr. Joy reported, shows temperatures as high as 10,000 de-

grees absolute. They are found in the small, red dwarf stars whose temperatures are cooler than that of the sun.

Previously, all variable stars had been considered to be stars of high luminosity whose light changes were accompanied by vast, but fairly regular pulsating movements and moderate changes in the temperature of the outer atmosphere.

Now, Dr. Joy said, it is certain that some of these variable stars are dwarfs, and that their light variations result from explosive outbursts covering limited areas of the star's surface.

A third type of dwarf variable may be two stars close together. One of them may have a shell that either expands or rotates at 450 miles per second, the other an atmosphere slightly cooler than that of the sun. At irregular intervals, the hot source blows up, increasing its intensity a hundred times.

Other types of dwarf variables include the novae, some of which can explode more than once. When they burst out, their brightness increases several thousand times. In the dwarf binaries, another type of variable, dark areas and bright prominences, similar to those of our sun, have been found.

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ASTRONOMY

Star Formation Theory

► A RUSSIAN astronomer's theory of star formation was examined and found partially wanting by Dr. Otto Struve of the University of California at the American Astronomical Society meeting in Boulder, Colo.

Russian Dr. V. G. Fessenkov's theory consists of two parts, the formation of stars in the galaxy at large, with which Dr. Struve was in general agreement, and the formation of star chains in filamentary gaseous nebulae, with which he disagreed.

The second part of the theory, Dr. Struve said, is "open to question." He has been unable to spot most of the star chains that Dr. Fessenkov uses as examples. In two or three filaments where chain-like formations appear to be present, they are few in number and probably of no "evolutionary significance," Dr. Struve reported.

Both parts of the Russian's theory make use of "tidal instability" on a large scale. This is similar for star formation to the tearing apart of a satellite when its distance

from a planet is less than about three times the radius of the planet. It is believed that this was the mechanism by which Saturn's rings were formed.

In the case of a star at large in our galaxy which begins to form out of a cloud of dust and gas, the disrupting body is the entire Milky Way, whose mass is 100,000,000,000 times that of the sun. This mass causes tides in the condensation of dust and gas, and these tides tend to tear it apart. Working against this disrupting force is the gravitational attraction of the condensation upon itself, which tends to keep it from being torn apart.

The condensation in any nebula, Dr. Fessenkov believes, wins this tug-of-war if its density is such that there are at least 100 hydrogen atoms in each cubic centimeter. The Orion nebula, for instance, has a density of about 1,000 atoms per cubic centimeter. Therefore, stars very likely are being built by condensation in this nebula, and in such other dense clouds as

the dark masses in Taurus, Scorpius and Ophiuchus.

The density that Dr. Fessenkov uses for formation of stars in the galaxy at large also accounts for the observed average distance between neighboring stars.

Science News Letter, September 5, 1953

NEUROLOGY

Human Body Defense Mechanism Investigated

► WHEN THE human body is under "attack," physically or mentally, a complex communications network is used by the brain to alert body defenses.

This network is being explored by University of California at Los Angeles and Long Beach Veterans Administration doctors, including Drs. Charles Sawyer, Sidney Porter, Sidney Roberts and Margaret Slusher.

There are four main stations in the network: sensory nerves—focus of the attack, which may be in the form of an injury to any part of the body; the brain; pituitary gland, and the adrenal system.

The research is concerned with how the network stations communicate with one another and what parts of the brain are involved in an attack, or stress, situation. Communications involve nerve fiber circuits and chemical messengers which travel in the blood stream.

Key network station in the brain has been identified as the hypothalamus. This brain center is apparently linked to sensory nerves by a nerve fiber circuit.

One source of communication between the hypothalamus and pituitary appears to be a chemical messenger which apparently travels through a vascular channel. This messenger stimulates the pituitary to send out ACTH, the familiar hormone now widely used as a therapeutic agent. ACTH goes to the adrenal glands and causes them to send out substances which aid the body in defense against stress situations.

Science News Letter, September 5, 1953

INVENTION

Patent Device That Detects Radiant Energy

► DRS. RALPH Bray, West Lafayette, and Karl Lark-Horovitz, Lafayette, Ind., received Patent No. 2,650,311 on a "radiant energy detecting method and apparatus," which they assigned to the Purdue Research Foundation, Lafayette.

Designed to detect relatively small changes in light or heat, the method involves directing radiant energy upon p-type semiconducting germanium. As the radiant energy grows stronger at the point-contact electrode, the back-resistance to current flow diminishes. Eventually a point is reached where current flows "backward" more easily than it flows "forward." A trigger device can be used to signal this change.

Science News Letter, September 5, 1953

• RADIO

Saturday, Sept. 12, 1953, 3:15-3:30 p.m. EDT
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Howard Meyerhoff, president, Scientific Manpower Commission; Dr. Karl Lark-Horovitz, head, department of physics, Purdue University; President F. L. Hovde, Purdue University; Ivan Rhode and Rebecca Hutto, previous winners of the National Science Fair, will discuss "Science for Youth."

ASTRONOMY

Sun Picked Up Comets 7,500,000 Years Ago

► THE SUN picked up, from outside the solar system some 7,500,000 years ago, the masses of materials that are now seen as comets, Dr. L. V. Robinson of the Wright-Patterson Air Force Base reported to the American Astronomical Society meeting in Boulder, Colo.

He bases his suggestion on the comet's slow disintegration, that is, their loss of tails and the development from them of the swarms of flying "gravel banks" that form meteor showers and that we sometimes see as "shooting stars."

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ASTRONOMY

Cosmic Rays Come From Outside Solar System

► PART, IF not all, of the cosmic radiation continuously bombarding the earth comes from outside of the solar system, Dr. Marcel Schein of the University of Chicago believes.

His conclusion, reported to the American Astronomical Society's meeting in Boulder, Colo., is based on the extremely high energy of the onrushing particles as they have been caught in photographic emulsions sent many miles above the earth's surface. It would be most unlikely, Dr. Schein stated, that the sun's magnetic field could accelerate the charged particles to such very high energies, greater than 10,000,000,000 electron volts.

The theory of extra-solar origin is also supported by some new experiments at the University of Chicago. By using two photographic plates sliding slowly past each other, cosmic radiation scientists are, for the first time, able to pin down the time at which the particle left its track.

With this new method, Dr. Schein and his associates have found that the variation between the numbers of tracks of heavy charged particles during the day and at night is not very great. This, he said, in a symposium on the origin of cosmic rays, argues for a cosmic ray source outside of our own solar system.

Science News Letter, September 5, 1953

The most spectacular comet of the 18th century was visible in 1744 for about four months, could be seen in the daytime and had six tails.

ASTRONOMY

Space View Extended

Ultrasensitive photometer that counts photons has doubled volume of space the giant 200-inch telescope can probe. Preliminary results hint at another distance revision.

► A NEW ultrasensitive photometer that literally counts individual photons, or packets, of light was described to the American Astronomical Society meeting in Boulder, Colo.

Use of the photometer has already doubled the volume of space that Mount Palomar's giant 200-inch telescope can view. It can now search out stars of magnitude 23, hundreds of millions times fainter than Sirius, the brightest star we see.

The device is being used to measure the very faint light received from galaxies far distant from our own Milky Way. Although it has already increased the seeing power of the world's largest telescope, eventually, Dr. W. A. Baum of Mount Wilson and Palomar Observatories foresees, it may even further enlarge the amount of space the telescope can penetrate.

The photometer is used to measure, simultaneously, the luminosities and diameters of galaxies lying beyond those in our own neighborhood of the universe. Astronomers have been continually devising new techniques for measuring the very faint light received from such objects, and the ultrasensitive photometer is their most recent development.

The combined results of the luminosity and diameter measurements are fitted to Einstein's general relativity equations. This enables Dr. Baum and his associates to sepa-

rate those differences that are due to the distance of the galaxy and its motion away from us from those that are caused by obscuring clouds and the life history of the object.

Preliminary results, Dr. Baum reported, seem to show that the change undergone by such objects as they go through their life cycles may materially alter the present ideas of how far away these galaxies actually are. These distances until now have been based on luminosity alone, without taking the evolutionary change into account.

The photometer, for the first time, makes it possible for astronomers to take photoelectric measurements with the 200-inch telescope down to the limit of photographic plate sensitivity. Thus Dr. Baum and his associates were able to get the first real measure of the giant's photographic range, which turned out to be half a magnitude beyond previous estimates.

The photometer, Dr. Baum explained, can "actually detect objects considerably beyond the photographic limits." Experiments in the subphotographic range, however, should wait until possibilities of electronic image receivers have been more thoroughly investigated. Dr. Baum reported details on how the photometer works at a conference on photoelectric astronomy at Flagstaff, Ariz., on Sept. 1.

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ASTRONOMY

Spiral Arms Traced

► THE FORM of the spiral arms of the great pinwheel galaxy to which the earth belongs has been traced, using two elements found in interstellar gas.

Both sodium and calcium helped Dr. Guido Munch of the Mount Wilson and Palomar Observatories draw a picture of the spiral arms that trail our Milky Way galaxy of stars. He spotted two sections of the spiral arms, separated by about 5,000 light years, of our watch-shaped star system.

His model, Dr. Munch reported to the American Astronomical Society meeting in Boulder, Colo., confirms the one proposed by Dr. W. W. Morgan and his collaborators at Yerkes Observatory from their study of interstellar hydrogen.

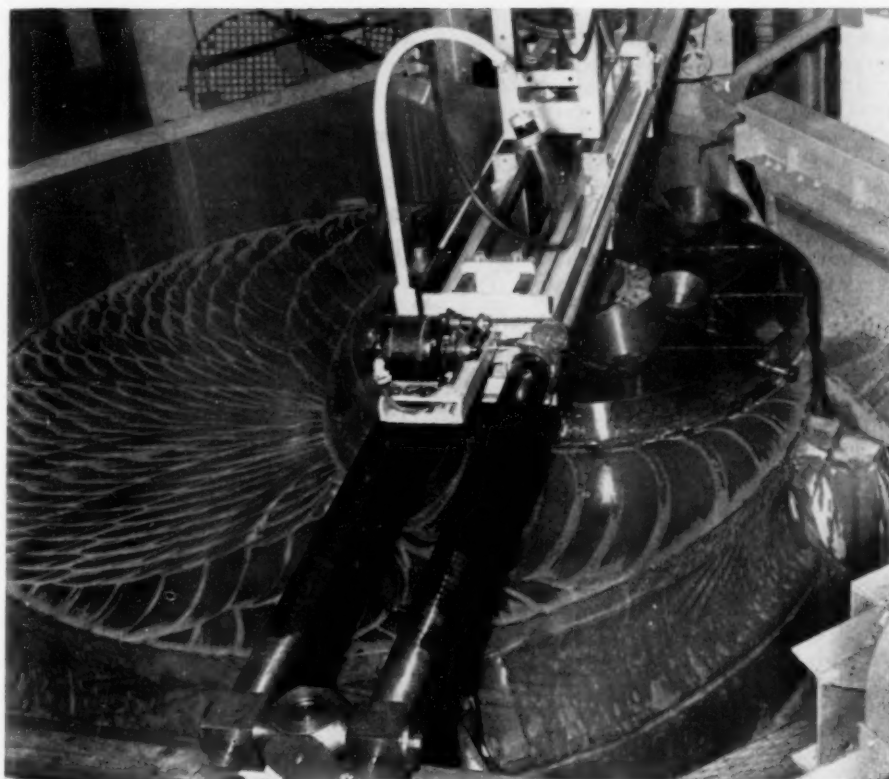
Hydrogen as well as the sodium and calcium in interstellar gas are signposts of spiral structure. Dr. Munch found that the interstellar gas clouds are concentrated along two paths in the Milky Way. Over

the region of space that he observed, they run roughly parallel to each other at a distance of about 30,000 million million miles (30 followed by 15 zeroes), or 5,000 light years.

The interstellar lines of sodium and calcium, Dr. Munch reported, appear separated when the stars are farther than 7,000 light years away. A light year is the distance traversed by light at 186,000 miles per second in one year, or nearly six million million miles. However, they always show as single lines when they are relatively "nearby," or less than 3,000 light years.

Dr. Munch believes that the separation found in the interstellar lines when the stars are more distant is due to the rotation of the galaxy. Dr. Munch is currently working at the National Astrophysical Observatory in Tonantzintla, Mexico.

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TELESCOPE MIRROR—Some 800 pounds of glass are now being removed from the mirror for the world's second largest telescope at Lick Observatory. Part of the grinding operations is shown here.

ASTRONOMY

Mirror Is Grinding Job

Grinding the parabolic curve required for the mirror of the world's second largest telescope is expected to be finished in about two years.

► GRINDING OPERATIONS are in full swing on the mirror for the world's second largest telescope, the 120-inch instrument now under construction at the University of California's Lick Observatory, Mt. Hamilton.

The telescope, which will capture the light of stars 900,000,000 light years distant, is scheduled for completion in about three years.

A part of the rough grinding of the mirror has already been completed. When the job is completed some two years hence, some 800 pounds of glass will have been removed from the four-ton pyrex disk, and the glass will have the perfect parabolic curve required for its mission.

At the present time, the disk is being placed in the cell which will support it in the telescope. In a few weeks, the cell containing the mirror will be returned to the grinding machine for the remainder of the polishing job.

The huge, versatile telescope will be used in a research program that will com-

plement that of the 200-inch giant at Mount Palomar. There are more problems in the far distant heavens than one telescope alone can cope with, says Dr. C. D. Shane, director of Lick Observatory.

A cooperative research program is being worked out between Lick, Palomar and Mount Wilson, in order that science will get the greatest benefit from the world's three largest telescopes, Dr. Shane said.

At the same time the 120-inch mirror is being ground, an impressive list of secondary mirrors is receiving the same treatment. These mirrors alone would duplicate or surpass the facilities of many smaller observatories, and three are larger than any of the telescopes now operating at Lick.

Now undergoing grinding are two 50-inch telescopes, one 44-inch and one 35-inch. The total list of 10 secondary mirrors includes one 33-inch, one 30.5-inch, one 31-inch, one 28.5-inch and two 10-inch.

All of the mirrors are needed for focusing the light gathered in the 120-inch mirror. For example, three of the large

mirrors, including one 50-inch disk, will bring light from the giant mirror to the spectrograph. The spectrograph itself will have six mirrors.

The conservative design of the telescope will make it one of the most versatile in the world. It will have prime and Coude focuses, with the possibility that a Cassegrain focus will be added later.

The steel mounting for the giant telescope is now under construction, and is scheduled for completion next year. It will include a huge 70-ton steel fork, the first mount of its kind for a large telescope, and a 53-foot tube. A motor will drive the tube, while another will rotate the fork.

Dr. Shane said that the lessons learned in construction of the 200-inch telescope have been applied to the new instrument through the constant cooperation of California Institute of Technology, which operates Palomar and Mount Wilson.

The mirror blank itself was made for tests for the 200-inch telescope. The mirror was never used, however, and was bought by the University of California from Caltech.

Design of the 120-inch telescope was executed by W. W. Baustian, senior engineer, formerly at Caltech. The polishing of the mirror is being directed by Donald Hendrix, who did the final correction of the 200-inch telescope.

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ASTRONOMY

Link Two Meteor Streams With "Parent" Comets

► TWO MORE meteor streams have now been linked with periodic comets, Dr. Fred L. Whipple of Harvard College Observatory reported to the American Astronomical Society meeting in Boulder, Colo.

All of the recognized visual and radar meteor streams "fall in the class of cometary origin," Dr. Whipple reported. Some astronomers have suggested that perhaps the asteroids, or minor planets, might be responsible for some meteor streams.

When the billions of tiny particles that are part of meteor streams crash into our atmosphere, many of them cause the brief streaks of light known as "shooting stars." About half of the meteors caught photographically are associated with a comet, Dr. Whipple said, and about half are random, or sporadic.

The two periodic comets that have now been linked up with meteor streams are Comet Tuttle 1926-IV and Comet Mellish 1917-I. Comet Lowe 1913-I probably also has an associated meteor stream, Dr. Whipple believes.

The meteors were photographed by cameras equipped with rotating shutters and located at two separated stations. The shutters make periodic breaks in the meteor's trail to reveal how much it is slowed down by the atmosphere. From this its speed before hitting our atmosphere can be calculated.

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AERONAUTICS

Parasitic Fighter Plane Protects Its "Mother"**See Front Cover**

► THE AIR Force's giant long-range bomber, the RB-36D, has been adapted to carry a protective fighter plane along with it on intercontinental reconnaissance missions.

Attached to the "mother" plane, an F-84 Thunderjet and its pilot can be dispatched quickly should the enemy challenge the big bomber in flight.

The speedy little jet fighter can be "retrieved" in flight by the mother bomber after the emergency is past.

The modified F-84 as it nears the retrieving mechanism is shown on the cover of this week's SCIENCE NEWS LETTER.

Air Research and Development Command headquarters in Baltimore report that the mother bomber and parasitic fighter have been modified to enable them to take off and land as a single unit. Tests at the Command's Wright Air Development Center at Dayton, Ohio, have revealed the feasibility of the unique operation.

This is the first time that a full-sized combat aircraft has been adapted to operate with another airplane as its base. Previous "piggyback" attempts have produced airplanes that can launch others. But until now these "mother" planes could not serve as flying landing fields for their "offspring."

The new arrangement is designed to provide protection and "high probability of survival for personnel and equipment" aboard the big plane. Begun in 1950, the project reached public fruition Sept. 5 to 7, when the plane was demonstrated at the National Aircraft Show in Dayton.

Science News Letter, September 5, 1953

GEOPHYSICS

Rockets Ballooned Aloft; Fired Upward 50 Miles

► ROCKETS ARE now carried about 10 miles into the air by means of balloons and then fired to an altitude of over 50 miles.

This new and inexpensive method of probing the upper atmosphere was described to the International Conference on Upper Atmospheric Research held in Oxford, England, by Dr. J. A. Van Allen of the State University of Iowa.

As much as 30 pounds of apparatus have been sent to higher altitudes by the balloon-rocket combination. Lifting the small instrumented rocket to some 50,000 feet altitude by means of a balloon eliminates the resistance of the lower atmosphere that rockets launched from the surface of the earth have to overcome.

The method has already been used for cosmic ray studies in the far north regions near the north magnetic pole of the earth.

Scientists expect that with this new combination they will be able to make many more measurements of the upper atmosphere, and thus get a better picture of what happens there to influence our weather and climatic conditions.

The next decade should see rockets rising a thousand miles or more above the earth, reports from a group of scientists from the U. S. Naval Research Laboratory indicated. Milton W. Rosen and Richard B. Snodgrass reported that in the last few years sounding rockets have increased altitude records tenfold. They bid fair to produce a similar increase in the next 10 years.

Twenty-nine tons of scientific instruments have been carried to altitudes between 30 and 136 miles in the last few years in the shoots from White Sands, N. Mex. The principal high altitude sounding rockets in use today are the Aerobee and Viking, since all the WAC Corporals and the captured German V-2 rockets have now been expended.

The sounding rocket is the ancestor of future space vehicles, the scientists explain, and it is a significant step in extra-terrestrial exploration.

Science News Letter, September 5, 1953

TECHNOLOGY

Laundered Clothes Get Germs While Drying

► SOME HOSPITALS and commercial laundries need to rearrange their plants to keep washed and practically germ-free articles from getting germy again while they dry.

University of Chicago studies showing this are announced by Dr. Clayton G. Loosli of the medical school research center and Brooks D. Church, formerly of the university's staff.

Their tests showed that germs in the dirty laundry were largely disposed of in the washing. However, the bedding became reinfected with germs floating in the laundry air during the water extraction process, while the blankets were hung in the laundry to dry, and during folding and packaging after ironing.

The source of the germs in the air was found to be from the unwashed bedding where the bacteria were dispersed into the air when the soiled laundry was sorted just before washing.

Dr. Loosli and his associate point out that many of the germs which settle out of the laundry air onto so-called "clean linen" are disease producers, and thus may find their way back into hospitals, military barracks, hotels and homes.

In the construction of hospital and commercial laundries, appropriate partitions and ventilating systems to keep the air clean can prevent laundered clothes from becoming soiled after they are washed. These methods can prevent the spread of some disease which may be acquired through contact with the washed but "unclean" linen.

Science News Letter, September 5, 1953

IN SCIENCE

CHEMISTRY

Amino Acid Plus Sun Gives Milk Off-Flavor

► THE CAUSE of the unpleasant flavor and vitamin loss that develop in milk standing in daylight in ordinary glass milk bottles for half an hour or more has been discovered by Drs. Stuart Patton and Donald V. Josephson of the Pennsylvania Agricultural Experiment Station, State College.

The "sunlight" or "activated" flavor, they find, develops because methionine, one of the amino acids in the milk, is changed chemically under the action of solar energy. This sun-activated effect is intensified by the B vitamin, riboflavin, which is also a natural constituent of the milk. In the course of the reaction, a substantial portion of the riboflavin is destroyed.

Most of the vitamin C in milk is also destroyed when the milk in ordinary glass milk bottles is exposed to daylight for a half hour or more. Whether this is related to the methionine change or is a separate effect of light on the milk is not stated in the report in *Science* (Aug. 21).

Discovery of the methionine-light-riboflavin reaction as cause of "sunlight" flavor came from the discovery that dilute solutions of methionine in water, when exposed to sunlight, developed a flavor that seemed identical with the "sunlight" flavor of milk.

The scientists then added a tiny bit of methionine to skim milk and found that the "sunlight" flavor was greatly increased when the milk stood in the light. Further tests, with three experienced judges testing the flavors, were then made.

The specific nature of the change in methionine under the action of sunlight and riboflavin is now being investigated.

Science News Letter, September 5, 1953

ELECTRONICS

Need Mississippi River to Cool Human-Like "Brain"

► MOST OF the Mississippi River would probably be needed to get enough water to cool an electronic "brain" as capable as a human brain.

And it would take a Pentagon-sized building to house the machine. The building would be crammed with wiring and tubes, and would use up as much electrical power as that consumed daily by this city, servo-mechanism engineers at Minneapolis-Honeywell estimate.

Capable as electronic "brains" are, the engineers stress, they do not come close to matching the human brain. The most elaborate models may some day equal an ant's brain, however, they estimate.

Science News Letter, September 5, 1953

NOE FIELDS

ENTOMOLOGY

Army Worms Nuisance In South and Midwest

► ARMY WORMS are making new gains in their concerted attack on the nation's grain fields.

The fall worms have dealt serious injury to late corn in Maryland, infesting up to 35% of the stalks in some parts. Tennessee also reports some heavy corn damage. Louisiana alfalfa, notably in the Shreveport area, is succumbing to the army-worm onslaught. And the fight is on in Kansas, too. But Oklahoma, hardest hit of all, is overrun by the pests—over two-thirds of the state has been invaded.

The yellow-striped army worm is reported on the march in northern areas of Utah, thus making the army-worm invasion widespread.

The farmer fortunately has means of defense against these grain plunderers: toxaphene, an effective insecticide, or methoxychlor, another good insecticide with the advantage that it can be used on animal-feed crops, since it does not affect the meat or milk of animals that accidentally eat it.

Actually, army worms are the young or larval stage of a small brownish moth, *Cirphis unipuncta*. Once they change into moths, they are harmless.

Science News Letter, September 5, 1953

GENERAL SCIENCE

Key Technical Personnel In Military Reserve

► APPROXIMATELY ONE-FOURTH of the 10,000,000 men of the nation's military reserve, consisting of those who have had military training and service, occupy key posts in essential industry, a survey by the Scientific Manpower Commission shows.

Quick mobilization could thus wreck vital industrial operations as these men are withdrawn from production and research, should there be a total mobilization, Dr. Howard A. Meyerhoff, president of the Scientific Manpower Commission, Washington, pointed out in an analysis of the situation. All of the reserve could be immediately recalled into the Army, Navy and Air Force in an emergency.

Highly skilled engineers, scientists, technicians and mechanics are needed to keep the armed forces supplied, mobile and powerful, Dr. Meyerhoff emphasized. Since the United States has the possibility of being inferior numerically to potential enemies, Dr. Meyerhoff contends that "we must counterbalance numerical deficiencies with technical superiority."

Urging that Congress enact the Johnson-Flanders bill to establish a national manpower board on specialized personnel that will hear appeals on the most effective use of reservists recalled to military duty, Dr. Meyerhoff said:

"We are pursuing an obsolete policy in our attitude toward brainpower, and, until our government places a higher value upon scientific and technological knowledge and skill, the safety of the nation will be endangered to a greater extent than we perhaps realize. In World War II our enemies were not so stupid, and, from all reports, neither are the Communists."

The Engineering Manpower Commission, New York, has found that there has been an alarming change in attitude on the part of Selective Service boards with reference to occupational deferments, and that the number of these deferments has dropped 16 2/3 percent during the past six months, notwithstanding the fact that the criteria for deferment have remained unchanged.

Science News Letter, September 5, 1953

ENTOMOLOGY

Insect Allies Battle Insect Pests on Farms

► ALL THE news is not black in the never-ending battle between man and insect pests. A recent report of insect pest conditions by U. S. Bureau of Entomology and Plant Quarantine field men shows insect allies are fighting for us against our six-legged opponents.

In California, large numbers of lady beetles are showing up in aphid-infested fields of cotton and reducing the pests' numbers. Already the lady beetles, *Hippodamia convergens* have successfully attacked bean aphids and walnut aphids in the state.

A spider mite infesting California cotton fields was counter-attacked by another beneficial insect, a thrips, *Scolothrips sexmaculatus*, and was beaten. Lacewings struck at harmful walnut aphids, while a tiny wasp, *Bracon xanthonotus*, cut down a harmful insect larva, *Sabulodes caberata*, population.

At the New York City port of entry, living larvae of the light brown apple moth were intercepted on a shipment of apples from New Zealand. This destructive moth of New Zealand, Australia and Tasmania does not occur on the continental United States.

On other fronts:

Grasshoppers are still causing much crop damage over scattered areas of the United States.

Fall armyworms have emerged in several new states—Maryland, Missouri, Oklahoma, Iowa, Texas and Arizona.

Second and third broods of codling moths have emerged or are expected to emerge, in time to harm orchards about the nation.

Crickets are attacking stored foods in the northern area of Mississippi, while in Oklahoma they are causing much damage to clothes.

Science News Letter, September 5, 1953

PSYCHOLOGY

Hoarding Due to Need For Activity, Security

► MAYBE THE woman who saves paper bags does it to feel secure and the man who hoards every scrap of string feels the need to be active.

This possible explanation is suggested by findings at the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me. The findings are from studies made with laboratory animals, such as rats. Other animals, especially those that hoard "naturally," should be studied, scientists at the Laboratory believe.

"Today, scientists feel that hoarding by animals is related to their need for activity, security, etc. Fifteen years ago it was thought this behavior was related to the animal's need to hoard materials necessary for survival," Dr. Sherman Ross, scientific associate at the laboratory and associate professor of psychology at the University of Maryland, stated.

Instinct, environmental stress, learning, fear and shyness all may play a part in causing an animal to hoard, it is thought. But the findings to date do not seem to fit together into any meaningful scheme. Many studies have been made but more are needed, Dr. Ross said, to explain fully why animals from rats to man hoard food and other material in excess of their needs.

Science News Letter, September 5, 1953

TECHNOLOGY

Cotton Fibers Improved By New Chemical Process

► THE TEXTILE industry has learned to treat cotton chemically to improve its fiber structure and to give new synthetic materials stiff competition.

Known as cyanoethylation, the process fortifies cotton fibers against attacks of mildew and bacteria, gives them greater strength after exposure to wet and dry heat, and makes them more receptive to all classes of dyes.

Further treatment can alter the fibers into products having even more desirable qualities, the Institute of Textile Technology, Charlottesville, Va., has discovered. The Institute is a cooperative research and educational center for the textile industry.

Known as the T-7 fiber family, the new cotton products in certain instances have been made considerably stronger by additional treatments. Yarns and fibers have been given extra "stretch" and greater resistance to scuffing than either the original cotton fiber or the T-7 fiber.

Familiar characteristics of cotton are unaffected by the new chemical process.

The basic chemical used in producing the new family was identified as acrylonitrile. This chemical is an important ingredient of many synthetic rubbers and acrylic textile fibers such as Orlon, Dynel, Acrilan and X-51.

Science News Letter, September 5, 1953

ZOOLOGY

Quiz Kids of the Ocean

A junior-sized whale, the bottle-nosed porpoise, is smarter than a dog, though not quite up to the chimpanzee. One has been trained to swim into a harness.

By HORACE LOFTIN

► ROD AND reel fishermen have contended long and vigorously that the denizens of the ocean are more intelligent than the average human—or average fisherman, anyway.

It seems they are wrong. The most brilliant ocean dweller yet studied by scientists is not really as bright as man. It is only smarter than a dog and somewhat less intelligent than a chimpanzee.

But the fishermen may defend their position. They were talking about fish that get away; the scientists referred to bottle-nosed porpoises, or dolphins, *Tursiops truncatus*, under observation and training in the oceanarium at Marineland, Fla. Like all whales, the bottle-nosed porpoise must breathe air to live, gives milk to its young, has hair at some stage of its life history, is warm blooded—and, in short, is a sea-going mammal, not a fish.

With the cautious, technical language of science, the porpoise has been described as follows: "In . . . his emotional and motivational behavior . . . the porpoise appears to fall somewhere in the range of development of a dog to chimpanzee." This means that porpoises are plenty smart.

Brain Is Convoluted

The brain of a six- or seven-foot porpoise averages somewhat larger than that of man. The porpoise brain is convoluted, a situation found in animals of a high order of intelligence.

The bottle-nosed porpoise colony of the Marineland oceanarium is a constant source of amazement to the thousands of tourists and dozens of scientists that come to observe them each year. These sleek, finned mammals, their mouths turned up into a perpetual, infectious grin, invent their own complicated games, and outwit the other inhabitants of the tank, and sometimes their "masters," with practical jokes.

The star boarder at Marineland is Flippy, the educated porpoise, who has been trained to perform a variety of almost unbelievable tricks.

At a word from his trainer, Adolph Frohn, Flippy will roll over and over in the water until signaled to stop. He will retrieve objects, honk a horn, ring his own dinner bell, and jump through a paper-covered hoop three feet above the water—all at the command of his trainer.

Flippy's (and trainer Frohn's) greatest achievement came, perhaps, when the porpoise allowed himself to be harnessed and

then towed a surfboard on which was riding first a little fox terrier, Flippy's friend, then a young girl. The porpoise enjoyed this lesson so much that he learned to swim into his own harness.

Most of the detailed study on porpoise behavior has been done on the bottle-nose, and especially those of the large Marineland oceanarium. There are 23 known species of porpoise-like whales along the Atlantic and Pacific coasts of the United States. Presumably these other species, as well as the larger whales, would show a degree of intelligence more or less similar to that of the bottle-nose if their I.Q. could be measured.

Porpoises are a noisy lot. Free-swimming schools send out a constant stream of sound ranging from bird-like whistles to a submarine Bronx cheer. A series of clicking sounds makes a good imitation of a door opening on rusty hinges.

So far as is known, these noises do not constitute a "language" for porpoises beyond advertising their presence or state of emotion. But Dr. W. N. Kellogg, animal psychologist with the Oceanographic Institute, Florida State University, believes that

porpoises may utilize their sound-making ability in a sonar system to avoid striking objects in the water as they swim at high speeds.

Porpoises emit sounds of very high frequency, detectable by their ears but beyond the hearing range of man. These sound waves, traveling at great speeds, echo back when they strike an object. A single click can travel to and return from an object two and a half feet from a porpoise in a thousandth of a second.

If, as Dr. Kellogg suspects, porpoises actually use their sound-making equipment as a sonar system, this means that a fast-swimming porpoise could, for instance, detect a submerged log in absolute darkness and still have time to turn safely aside.

Name Is Misleading

A cetaceologist, or whale expert, would fret at calling the bottle-nose a "porpoise." But more people would fret at using the technically precise term "dolphin," which to most Americans means a kind of fast, voracious game fish, *Coryphæna*.

To set the record straight, the bottle-nosed "porpoise," as it is almost universally called in America, is technically the bottle-nosed "dolphin." In the language of the experts, dolphins are small, toothed whales of the family *Delphinidae* that have a pronounced beak or snout, like our bottle-nosed. True porpoises are whales of the same family that lack this pronounced beak generally. Other members of this family, like the killer whale, conform to neither of these two general groups.

As a practical matter, though, the general acceptance of the term "porpoise" to include all members of the *Delphinidae*, and the term "dolphin" to refer to the fish *Coryphæna*, makes the fine splitting of difference between dolphin- and porpoise-whales of little value to anyone except the expert. And to fishermen, it is only a source of confusion.

Cousins Are Whales

The familiar, friendly porpoises of our coasts are first cousins to the vicious killer whale; the tusked narwhal, or "unicorn of the sea," and the 60-foot-long sperm whale. These are all in the sub-order of toothed whales. Second cousins of the porpoises are those of the sub-order of toothless, or whalebone, whales. This group includes the blue whale, the largest animal ever found on earth, surpassing the monstrous prehistoric dinosaurs.

Blue whales are about 23 feet long at birth; two years later, when they are sexually mature, they average about 72 to 74 feet long. Full grown blue whales sometimes measure over 100 feet in length and may weigh over 115 tons—about 230,000 pounds.



THE EDUCATED PORPOISE— Flippy is shown here raising a flag to begin his routine of tricks. The porpoise retrieves objects, honks a horn, rings his own dinner bell, jumps through a paper-covered hoop three feet above the water at commands from his trainer.

Yet these leviathans cannot swallow anything much bigger than a shrimp or a herring, so small is their throat. Their food is mainly minute plankton material, which they obtain by straining hundreds of gallons of water through the hair-like whalebone that lines their jaws.

Suited to Water Life

All of the whales, from the four-foot harbor porpoise to the 100-foot blue whale, are admirably adapted for permanent life in the water. In the course of millions of years of evolution, their bodies have become streamlined to offer least resistance to water. Their nostrils have migrated upward to a position on top of their skulls, from which they can breathe while floating at the surface. Their young are born and are nursed in the water.

They have lost their hind limbs, except for stubs of bone internally. Their forelimbs have developed into fins, and a great fluke or tailfin has been evolved to propel their great mass at high speed through the ocean.

Incidentally, you can always tell a whale from a fish—if you have any doubt—by the position of the tail. The tails of fish are lined up vertically; the tails of whales are horizontal.

Science News Letter, September 5, 1953

GERONTOLOGY

Artery Trouble May Be Tied to Heparin Lack

► PATIENTS WITH a severe form of artery hardening may be suffering from a deficiency of a body chemical just as diabetes patients suffer from deficiency of insulin.

The first evidence suggesting this was presented by Dr. H. Engelberg of the Cedars of Lebanon Hospital, Los Angeles, at the meeting of the Gerontological Society in San Francisco.

The chemical the people with sick arteries lack is heparin. This substance has the power to keep blood from clotting and has been used in recent years as treatment for persons suffering from blood clots that threaten life.

As insulin plays a part in the body's use of sugar and starches, heparin may play a similar part in the body's use of fats, Dr. Engelberg thinks.

Defective handling of fats and fatty substances, such as cholesterol, is believed by some scientists to be the cause of the artery disease doctors call atherosclerosis. The layman would call it hardening of the arteries, but actually it is a form of artery hardening in which there is fatty degeneration of connective tissue of artery walls.

The amount of heparin in the blood plasma, Dr. Engelberg finds, declines with age. Also, the amount of heparin in the blood of healthy normal persons is higher than that in the blood of the majority of patients with atherosclerosis.

Science News Letter, September 5, 1953

NUTRITION

Map Human Starvation

► MAPS THAT can help chart a course for economists, statesmen, nutritionists and doctors seeking the treasure of food and health for all the world have just been published.

They are world starvation maps prepared from the "Study in Human Starvation" just completed by the medical geography department of the American Geographical Society. The study is sponsored by the Office of Naval Research.

One map shows areas of the world where the people have an adequate diet, areas where the diet is lacking in calories or protein or vitamins or other essential nutrients, and where diseases resulting from inadequate diets afflict the populations.

A companion map shows areas of the world where various foods, from beef to yams, are produced and how much of each.

Dr. Jacques M. May, author of the maps and head of the society's medical geography department, says the map show many factors contribute to the overwhelming prevalence of malnutrition throughout the world. And, he says, there does not seem to be one single solution to world starvation. The problem each country faces is different.

Some facts shown by the maps: Almost two-thirds of the world's people today are starving though world production, if prop-

erly distributed, seems to be enough to feed everyone.

India, Ceylon, China, Indonesia, Pakistan and the Philippines seem to be the only countries in the world unable to provide each person daily with the necessary amount of food adequate in energy and protective (vitamin and mineral) values.

The only countries in the Western Hemisphere enjoying an adequate diet are the United States, Canada, Uruguay, Paraguay and two-thirds of Argentina.

The people of Western Europe, except those in Portugal, Spain, Italy and East Germany, have adequate diets.

Data released by the U.S.S.R. seem to indicate that Soviet Russia provides an adequate diet, but the American Geographical Society has gathered data showing the location of numerous forced-labor camps where starvation diets exist.

The only other countries with adequate diets are: Greece and Turkey in the East; Kashmir, Nepal, Tibet, Thailand, Cambodia and Formosa in the Far East; Somaliland and Portuguese Guinea in Africa; Australia and New Zealand.

The rest of the world subsists on diets lacking in both energy and protective values, or in protective, tissue-repairing value.

Science News Letter, September 5, 1953

CHEMISTRY

Turn Garbage to Humus

► A FAST, practical method of turning garbage and other organic refuse into humus to enrich farmlands has been developed by University of California scientists.

They set up a compost heap composed of refuse, maintain the right conditions, and micro-organisms present in the refuse effect the conversion. No esthetic nuisance or smell is created in the operation.

No decomposing agents or chemicals are required. The compost heap, properly manipulated, has all the elements required to convert itself into humus—in 12 to 21 days, at a cost of from \$12 to \$15 a ton.

In addition to the right micro-organisms, the refuse has all the nutrients, moisture and acid requirements needed. Proper handling of the heap allows it to generate enough heat to promote optimum decomposition and to destroy harmful bacteria and flies.

Aeration by turning the heap is required to promote bacterial action and meet other requirements. Special equipment for this job has yet to be designed, but the scientists believe these problems can be worked out for commercial composting.

Primitive, small-scale composting has been practical all over the world for cen-

turies. It is carried on to some degree on a municipal scale in Europe, South Africa, Australia and India—in each case by methods fitting the conditions peculiar to the area.

The method developed by the Berkeley sanitary engineers, under the direction of Dr. Harold B. Gotaas, is considerably faster than any other large-scale method.

Composting has been of little importance in the United States because the need for new methods of refuse disposal has become urgent only recently, and the shortage of organic matter in the soil has never been as acute as in Europe and Asia.

The scientists say composting has many advantages. In addition to providing a cheap soil enricher, it is a better method of disposing of garbage and other organic refuse. It promises better sanitation. It should be a boon where existing sites for refuse disposal by land-fill are being taxed by explosive population growth. And it avoids the burning which adds to the smog problem in some communities.

Participants in the project were Bradley J. Card, Clarence Golueke, L. G. Riche, P. H. McGahey and W. F. Langelier.

Science News Letter, September 5, 1953

Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AIR ENTRAINED CONCRETE: Properties of Air Voids and Service Record of Pavements—Curtis Warren and L. E. Andrews—*National Academy of Sciences—National Research Council*, Highway Research Board Bulletin 70, 23 p., illus., paper, 45 cents. Small air bubbles distributed throughout the concrete used in highways increase its ability to withstand freezing and thawing, and prevent scaling.

ATOMIC WEAPONS IN LAND COMBAT—Col. G. C. Reinhardt and Lt. Col. W. R. Kintner—*Military Service Pub. Co.*, 182 p., illus., \$3.95. To meet the need of the American to "understand, respect, but not fear weapons his own country developed for its defense."

ATOMS AND ENERGY—H. S. W. Massey—*British Book Centre*, 173 p., illus., \$3.50. The scientific basis for the development of modern atomic weapons, as well as the production of power from atomic energy. The author also evaluates present-day research on the relations between matter and energy.

BACTERIAL GENETICS—Werner Braun—*Saunders*, 238 p., illus., \$6.50. Devoted to a new science with real "hybrid vigor." Especially for bacteriology students who wish to learn of the more important genetics findings that concern them.

BLAZER THE BEAR—Robert V. Masters and Fred Reinfeld—*Sterling*, 60 p., illus., \$2.00. This story of forest fires for children emphasizes the work of the Forest Rangers and "smoke jumpers."

CEILING UNLIMITED: The Story of American Aviation From Kitty Hawk to Supersonics—Lloyd Morris and Kendall Smith—*Macmillan*, 417 p., illus., \$6.50. A wealth of photographs illustrates this readable book celebrating the 50th anniversary of powered flight.

CLIMATE, VEGETATION AND MAN—Leonard Hadlow—*Philosophical Library*, 288 p., illus., \$4.75. The author, writing in Manchester, England, sees Britain as "the Fortunate Isles," with "people, never knowing what to expect from the ever-changing weather, kept mentally alert."

DEFENSE AND THE DOLLAR: Federal Credit and Monetary Policies—Albert G. Hart—*Twentieth Century Fund*, 203 p., \$2.00. Discussing the technical, but highly important, subject of the use of monetary and credit policies in the prevention and control of inflation.

ECONOMIC CONTROLS AND DEFENSE—Donald H. Wallace—*Twentieth Century Fund*, 260 p., \$2.00. It is generally acknowledged that controls are necessary in times of extreme crisis. The question here considered is how serious must be the crisis to require such measures.

LABORATORY INSTRUMENTS: Their Design and Application—A. Elliott and J. Home Dickson—*Chemical Publishing Co.*, 414 p., illus., \$7.50. For the research worker or teacher who needs to have instruments constructed especially to meet his own needs.

OVERCOMING BACK TROUBLE—Helen Jeanne Thompson—*Prentice-Hall*, 214 p., illus., \$3.95. Describing the structure of the spine and the various things that can go wrong with it. Instructions for a series of exercises that the author believes will prevent or relieve back pain are also presented.

SQUARING THE CIRCLE AND OTHER MONOGRAPHS—E. W. Hobson, H. P. Hudson, A. N.

Singh and A. B. Kempe—*Chelsea Publishing Co.*, 51 p., illus., \$3.25. Here are discussed some of the problems that have puzzled mathematicians since remote antiquity.

WHO'S AFRAID OF THUNDER?: The Story of the Weather—Howard E. Sandman—*Sterling*, 61 p., illus., \$2.00. Children will learn about clouds, rain, lightning and thunder as they read about a visit to an airport weather station. Ages 7 to 10.

Science News Letter, September 5, 1953

INVENTION Talking Dictionary Translates Languages

► A "TALKING dictionary" has been invented which pronounces words audibly for the user and which also can be rigged to translate written foreign languages into audible English.

It uses a group of flexible acetate belts with grooves cut in them. The grooves record the proper pronunciation of words which the user hears through a loudspeaker.

Printed words appearing under windows on the face of the device permit the user to select the word he wants pronounced. Then a pickup is lowered into the proper groove and the word comes through the loudspeaker.

Inventor Leslie L. Erdos of New York says his talking dictionary is particularly useful in the study of foreign languages. Furthermore, he points out, the dictionary can be fixed so that foreign words can be selected in the windows, but that their meanings are given in English or in another language. The talking dictionary received patent No. 2,650,097.

Science News Letter, September 5, 1953

PHILOLOGY Language Disproves Theory of Kon-Tiki

► LANGUAGE DISPROVES that the Polynesians came from America as the Kon-Tiki voyage westward across the Pacific led Thor Heyerdahl to contend.

Evidence for this is communicated by Prof. Alan S. C. Ross of the University of Birmingham, England, to *Nature* (Aug. 22).

No relationship exists between Polynesian and any American language-family, Prof. Ross observes. But philologists do find that Polynesian is related to Indonesian. There are written texts in old Javanese, which is an Indonesian language, of at least the eighth century A.D., and Primitive Indonesian was spoken earlier.

Thus language ancestral to Polynesian existed before Mr. Heyerdahl's supposed two waves of "Polynesians" coming from America, one about 500 A.D. from Peru and another about 1000 A.D. from north-west North America.

Comparative philology affords "an absolutely decisive disproof" of the Kon-Tiki theory in Prof. Ross' opinion.

Science News Letter, September 5, 1953

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What General Electric people are saying . . .

C. H. LANG

*Mr. Lang is Vice President
in charge of Public Relations*

" . . . In large measure, our Puritan ancestors insisted that liberty was dependent upon the general education of the country's citizenry. Our industrial system, as we know it today, is dependent on the education of that same citizenry. If we lose sight of this fact, we also lose sight of the fact that under a totalitarian system every industrial plan, or scientific research plan, becomes a State-plan. Every manager in industry becomes, in reality, a civil servant. Political democracy and industrial democracy depend on each other, and both depend on education.

There are two great educational objectives in America. First, we must endeavor to combine the British concern for training the "natural aristocracy of talents" with: Second, the American tradition and insistence of general education for *all* future citizens. If we can do this, then our industrial society will prosper, and at the same time the necessary degree of instruction will be provided for all people so that in their hands "our liberties will remain secure."

*at a Meeting of Charles Coffin and
Gerard Swope Fellows,
Schenectady, New York*

L. P. GROBEL

*Mr. Grobel is Supervisor,
Generator Mechanical Engineering, Large
Steam Turbine and Generator Department,
Turbine Division*

" . . . Precision balanced rotors have given smoother running turbine-generators with a great reduction in the amount of balancing needed at installation. High-speed 3600-rpm units placed in operation in 1949 had an average bearing vibration of 0.42 mils. By contrast, in 1950, when many of the present precision-balancing practices were adopted, this figure dropped to 0.30 mils. And during the years 1950 and 1952, it has remained nearly constant at 0.26 and 0.27 mils, respectively.

The 1949 turbine-generators were good machines. Current reduction of 35 per cent in vibration simply means that today's precision-balanced machines have still less vibration. Over the same four-year period—1949 to 1952—there has been a decided reduction in the amount of balancing at destination. An average of 7.4 balancing trials were taken on the 1949 machines; this figure decreased to 5.2 a year later, became 2.4 in 1951 and 2.0 in 1952. During 1952, 58 per cent of all turbine-generators shipped needed no further balancing at destination.

G.E. Review

C. D. GREENTREE

*Mr. Greentree is Manager,
Engineering and Consulting
Application Services Department,
General Engineering Laboratory*

" . . . A most important early activity of the project engineer is to decide what is known and what is unknown. In almost any large project, only 5 to 10 per cent of the total effort is involved with new knowledge. Some 90 to 95 per cent of the total effort is concerned with the manipulation of existing materials, mechanisms and circuits into different combinations by means of known laws, formulas and design data. Furthermore the bulk of each manipulated combination is straightforward development and design engineering. I equals E over R, Force equals Mass times acceleration. But some portions of some of the combinations do contain the new idea, the tricky circuit, the new knowledge or data. The problem of the project engineer, with the help of his task engineers, is to spot where these are and furthermore to spot them with a high degree of technical accuracy. Then he must start work on these new idea areas first before

spending time and money on the straightforward part which will be wasted unless the key portions work.

*at The American Society
of Mechanical Engineers
Philadelphia, Pa.*

HERBERT SCHREIBER, JR.

*Mr. Schreiber is an
Industrial Product Engineer,
General Electric X-Ray Department*

" . . . The first and obvious requisite for cathode-ray sterilization is the penetration or accelerating voltage required for the product and container size. Here two factors control the ultimate decision; namely, 1) Is complete penetration required or will surface sterilization be sufficient? 2) Can the physical dimensions of the product to be irradiated be changed for a more practical solution? The question of complete sterilization as opposed to surface sterilization can only be answered by the ultimate aim of the user. In many cases it is only desired to extend the shelf life of the product and a surface sterilization will often accomplish this purpose. In addition the severity of any organoleptic changes is usually increased with higher penetration thereby making higher voltage a detriment rather than an aid. Of course, if complete sterility is required then the cathode-ray generator must necessarily have sufficient voltage to penetrate the entire sample. The only alternative here is a change in the thickness or mode of packaging of the product thereby decreasing the ultimate penetration required. The factors controlling this decision are the additional costs of higher voltage equipment as opposed to the costs of changes in product dimensions or packaging techniques.

*Cathode Ray Sterilization Symposium,
Milwaukee, Wis.*

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METALLURGY

Why Metals Make Good Bearings Told in Tests

► WHY A bearing runs smoothly without "freezing" or welding to the journal that revolves in it has been puzzled out scientifically by a research team at the General Motors Research Laboratories in Detroit.

It is a matter of how much iron of the revolving shaft is dissolved in the bearing metal at its melting point, which is reached at the bearing surface when the bearing heats up. Those metals with extremely limited or negligible solubilities in iron, such as lead, tin, indium, thallium and cadmium, have good score resistance, as the property of resistance to such welding is called.

The scientists, Arvid E. Roach, Carl L. Goodzeit and Paul A. Totta, reporting in *Nature* (Aug. 15), find that the more dissimilar two metals are, the greater will be their score resistance when rubbed together.

Films of compounds such as oxides, chlorides, sulfides, selenides and the like have good score resistance.

Science News Letter, September 5, 1953

Belgian Congo natives reverently refer to the helicopter as "the ventilator."

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ZOOLOGY

NATURE RAMBLINGS



America's Cherubim

► FROM BISON to bodiless child-angels may seem a very far cry, yet there does seem to be a fairly continuous chain of descent.

The majestic winged human-faced bulls that guarded the gates of palaces and temples in ancient Mesopotamia were known by the Semitic name from which our word "cherubim" is derived. Because of their bellowing voices, thunderclouds were imagined by the ancients as flying bulls, the steeds of the highest of the gods.

Originally, these winged bulls were the old-world species of bison, or wisent, now all but extinct. Known in the earliest

times in the Tigris-Euphrates valley, they had disappeared long before Babylon grew great. Hence the conventional representations had bodies more like those of domestic cattle. Yet their origin is traceable in their curved horns, symbols of power, and in their beards.

How these fabulous cloud-bulls were transformed into the second-highest order in the angelic hierarchy might be a long story. Sufficient to suggest here that the "cherubims" (a false plural by the way) described with meticulous detail in the 25th chapter of Exodus are believed by some archaeologists to have been images much like those surviving in the Mesopotamian ruins—proper seat for the God who was above all gods. And since images must not be made of Him, soon images were no longer attempted of them.

The puckish mischance by which the cherubim, after they had become very great angels, were further transmogrified by modern fancy into the littlest of angels—often consisting of head and wings only—is still another story. But from the mighty cherubim of antiquity to the "sweet little cherubs" of modern picture cards is surely a strange evolution!

Yet you can catch a far glimpse of how it all started, the next time you visit the zoo, or better yet, ride through Yellowstone National Park. Just wait until one of the majestic old bison lifts his head and looks at you. Isn't there something hauntingly near-human in the look of that horn-crowned, bearded face?

Science News Letter, September 5, 1953

GERONTOLOGY

Retirement Activity Plans

► ABOUT 80% of successful executives, the bosses of most of us, need help in answering the question, "What shall I do after I retire?"

Even those with enough money and much experience in planning and directing the activities and energies of others are likely to flounder in planning for their own retirement. From long interviews with more than 500 such men, H. R. Hall, consultant on executive retirement of Wellesley Hills, Mass., and formerly on the faculty of the Harvard Graduate School of Business Administration, has drawn up 15 guidance suggestions. He reported them to the Gerontological Society meeting in San Francisco. Some of them follow:

Guard and nourish your health and get your wife to do likewise.

Consult with your wife from the start and during retirement planning.

If you want to take a "long trip" or "deserved and desired rest" at the start of retirement, be sure important elements of your activity program are tied down beforehand.

Plan an active life both physically and mentally. Include some work that brings

pressure and resulting tension. The need for a minimum of tension when he retires remains in the executive's system.

Most men do not find hobbies alone bring enough satisfaction for retirement time, though they should be included in the retirement program.

The program should include at least one job, done wholly without monetary return, which includes the satisfaction of doing for others.

Science News Letter, September 5, 1953

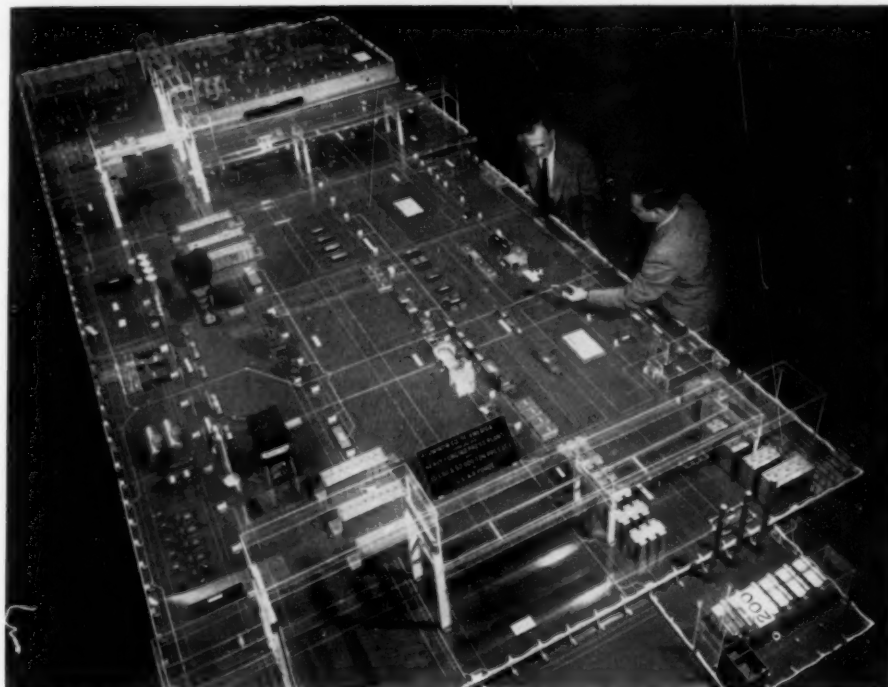
GERONTOLOGY

Dangerous Age for Men Set Between 50 and 65

► The DANGEROUS age for men in this country comes between 50 and 65 years, Dr. W. H. Lewis, Jr., of New York stated at the meeting of the Gerontological Society.

It is at this age that high blood pressure and diseases of the heart's arteries prevail. It is the most "significant mortality period" for men, while the most significant age of illness and mortality is after 50 years.

Science News Letter, September 5, 1953



MODEL PLANT—The scale model of the Air Force heavy forging press plant being built at Alcoa's Cleveland works. Use of the layout allowed shop foremen to contribute their knowledge to the final plans.

GERONTOLOGY

Warding Off Infection

► **SMALL DAILY** doses of aureomycin can help protect elderly men and women from infections that often prove fatal to bodies already weakened by other diseases.

Studies showing this were reported by Drs. Douglas H. Sprunt and Leon Victor McVay, Jr., of the University of Tennessee College of Medicine, Memphis, at the meeting of the Gerontological Society in San Francisco.

As the population ages, infectious diseases are no longer the chief cause of death, but they remain a grave problem, they pointed out. As complications of chronic degenerative processes, they terminate the lives of countless elderly people, particularly those suffering from diseases of the heart and blood vessels, diabetes, chronic bronchitis, bronchial asthma, pulmonary emphysema and bronchiectasis.

The studies covered 149 patients having chronic congestive failure, 189 with diabetes mellitus, and 30 with extensive chronic respiratory disease. Alternate persons received 250 milligrams of aureomycin, technically known as chlortetracycline, twice a day. The remainder were given an identical placebo (make-believe medicine). Neither the physician nor the patient was aware of which medication a given individual received. The average length of treatment for the entire group was 19 months.

A decrease of at least 50% in respiratory

infections occurred in 30 of the heart patients on aureomycin, compared with only four of the heart patients getting placebos, the physicians reported.

"Moreover, 36 of the aureomycin cases regarded themselves as better because of treatment," the report said. "This contrasted with only 23 of the controls. One patient in the antibiotic group considered himself to be worse as compared with seven in the controls."

Of the diabetics, 68 on aureomycin said they felt better, compared with only 29 of the controls, and laboratory tests indicated a much lower concentration of infectious germs in the blood of those getting aureomycin. Fifty-one of the aureomycin group enjoyed a reduction of at least 50% in the number of chest infections sustained during the period, compared with only 20 of those receiving no aureomycin.

Subjective improvement of aureomycin patients suffering from chronic respiratory diseases was much more marked than in those of this series getting placebos, and these views were supported by objective physical and laboratory findings.

Science News Letter, September 5, 1953

More than 40,000 boat accidents were reported in 1952 to the Coast Guard; many of these are believed due to uncorrected hearing troubles of the boat operators who did not hear warning sounds such as fog horns.

GERONTOLOGY

Calcium Lack Leads to One Kind of Arthritis

► **EATING PLENTY** of calcium-rich foods, such as cheese, green leafy vegetables and milk, could help ward off the arthritis of old age.

Studies suggesting this were reported by Dr. L. W. Cromwell of San Diego at the meeting of the Gerontological Society in San Francisco.

A strong possibility exists, he thinks, that prolonged lack of calcium results in porous bones. The body makes up for this at areas of stress by deposits of extra calcium. Following on this theory, Dr. Cromwell examined patients at the Arthritic Clinic, asking about their diets over the years.

The hands of the older patients, he found, usually told the story of whether or not their owners had been getting too little calcium for many years. The bulges on finger joints, called Heberden's nodules, and other arthritic changes in their fingers were much more marked in those with low calcium intake over the years.

Women who had both ovaries removed at an early age, he found, developed the old age kind of arthritis at an earlier age than the average woman. Among brothers and sisters, those who took little calcium showed more osteoarthritic changes than those on high calcium intake.

Interviews of 500 oldsters showed that those with marked osteoarthritic changes on the whole had suffered from prolonged low-calcium intake.

Other factors involved in the development of this old age arthritis are protein intake, amount of male and female hormones in the blood, vitamin D intake and certain metabolic and mechanical influences.

Science News Letter, September 5, 1953

QUESTIONS

ASTRONOMY—How can a dwarf star's growth be watched? p. 149.

What elements can be used to trace the spiral arms of our galaxy? p. 150.

...

CHEMISTRY—How does milk exposed to sunlight get its off flavor? p. 152.

...

GENERAL SCIENCE—What four major actions have recently been taken concerning the National Bureau of Standards? p. 148.

...

GERONTOLOGY—Lack of what chemical may cause artery hardening? p. 155.

...

TECHNOLOGY—How can laundered clothes pick up germs? p. 152.

...

Photographs: Cover, Consolidated Vultee Aircraft Corp.; p. 147, Fremont Davis; p. 151, Lick Observatory; p. 154, Marine Studios; p. 159, Aluminum Company of America; p. 160, Bakelite Company.

• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 690. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

☼ **BEARD POWDER**, designed especially for men who use electric shavers, is compressed into a stick that is rubbed over the whiskers before shaving. The powder provides a smooth surface, permitting the razor to glide easily over the face even in muggy weather.

Science News Letter, September 5, 1953

☼ **SAFETY LATCH** for doors to refrigerated rooms should help reduce tragedy when persons are accidentally locked in walk-in cold storage rooms, or when robbers force them into such rooms at gun-point. The latch has a handle that opens the door from the inside.

Science News Letter, September 5, 1953

☼ **TINY POWER** tool is suitable for hobbyists and professionals who work in plastic, metal, wood, glass, leather and bone. Equipped with 40 accessories for grinding, polishing, carving, drilling, cutting, sanding, sawing, engraving, shaping and routing, the device is only six inches long and is held like a pencil. It has a high-speed electric motor that operates on household current.

Science News Letter, September 5, 1953

☼ **BOOK JACKET** features paper covers for the book and a translucent polyethylene plastic strip that fits over the spine making



the title easy to read. Adjustable to books of various sizes, the jackets, shown in the photograph, can be used by students and can be imprinted with school colors, names and insignias.

Science News Letter, September 5, 1953

☼ **COUNTER COFFEE** maker for hotels and restaurants brews 400 cups in an hour. Using a frozen liquid coffee concentrate,

the machine is fully automatic when connected to a water line and when plugged into 110-volt current. Coffee is dispensed at the touch of a pushbutton.

Science News Letter, September 5, 1953

☼ **SPONGE MOP** has a built-in brush for attacking stubborn dirt spots. The device also features a sliding "rinsing bar" that slips up and down the handle to wring out the sponge. The brush bristles are made of styrene plastic filaments that resist soap, moisture and detergents and that are said to outlast ordinary bristles five to one.

Science News Letter, September 5, 1953

☼ **PLAY PEN** resembles in its construction the lattice gates now widely used to prevent tiny tots from falling down the front porch stairs. The pen expands into a large circle giving 23 square feet of playing space that is covered by an easy-to-clean quilted pad. The pen rolls into a tight, eight-inch-diameter bundle when not in use.

Science News Letter, September 5, 1953

☼ **NEW EXPOSURE** meter for color-film enthusiasts has a perforated metal tab that slips into the meter proper. The meter needle points directly at the proper lens opening for a shutter speed of 1/50 second. The meter can be used in color 3-D photography, either still or movie. It also can be used in standard black-and-white photography with still or movie cameras.

Science News Letter, September 5, 1953

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Do You Know?

The world gains 70,000 persons each 24 hours.

A model airplane has been built that can lift a payload 3.5 times its own weight.

Protective finishes for modern automobiles are only 1/3000th of an inch thick.

Electric light traps can help detect the pink bollworm in cotton areas thought uninfested.

The cloud swift of the West Indies is probably the fastest flying bird; it has been clocked at speeds of 171 to 200 miles an hour.

The odor of flowers is determined by the number and arrangement of carbon, hydrogen and oxygen atoms making up the fragrant compounds.